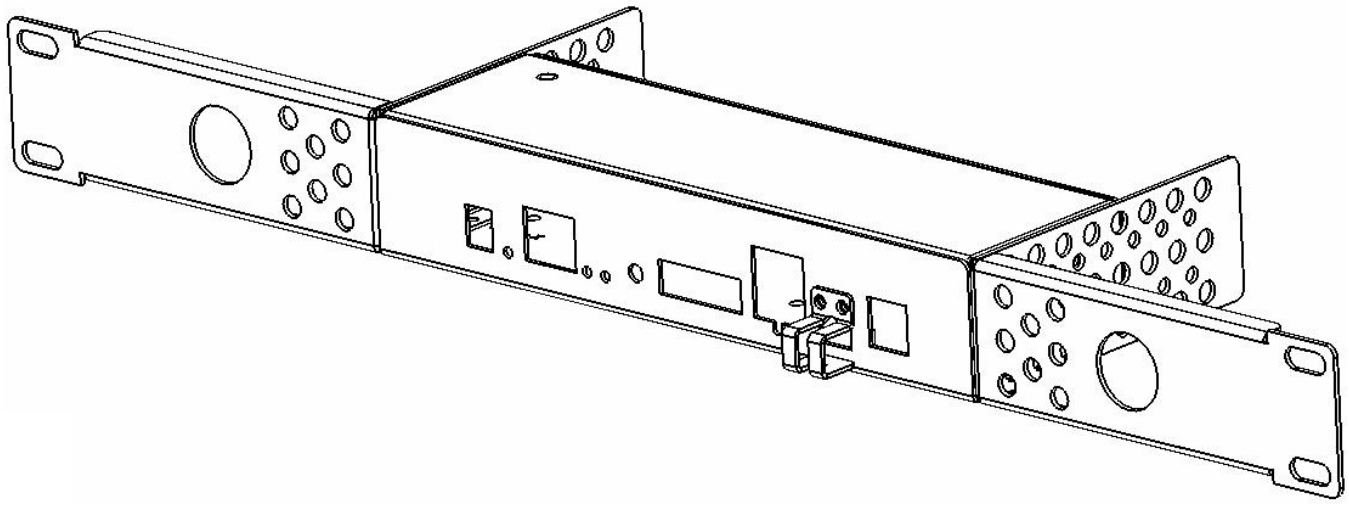
GEIST

Instruction Manual
Environmental Monitoring Unit with Output Relay

BB100 Series
Firmware Version 3



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Specifications

Overview

The BB100 provides remote environmental monitoring and alarming capability needed to detect climate conditions in data centers. Additionally, the BB100 provides one output relay that can be operated remotely or set to automatically open or close based on alarm conditions. The BB100 is equipped with a built-in web server with a 10/100 Mbps connection speed. Web pages are generated by the unit to monitor local environmental conditions. No software other than a web browser is required for operation and several data formats are available. The BB100 has a built-in sensor to monitor temperature, humidity and dew point, as well as one port for adding remote sensors. The BB100 also has four I/O ports for connecting additional external 5Vdc sensors such as Water and Door Sensors. The BB100 can be optionally configured at the factory to support Power-Over-Ethernet (PoE).

Environmental

Temperature

Operating:	10°C (50°F) min	45°C (104°F) max
Storage:	-25°C (-13°F) min	65°C (149°F) max

Humidity

Operating:	5% min	95% max	(non-condensing)
Storage:	5% min	95% max	(non-condensing)

Elevation

Operating:	0 m (0 ft) min	2000 m (6561 ft) max
Storage:	0 m (0 ft) min	15240 m (50000 ft) max

Electrical

6-12 Volts DC, 2 Amps

Output Relay Contact Ratings

The output relay contacts are intended to carry low voltage signals only. Do not exceed the following ratings on the output relay contacts:

DC: 60 V, 30 W

AC: 30 Vrms, 1 A

Warning: Consideration should be given to lockout-tagout and other procedures required for servicing external devices controlled by the BB100 output relays. Appropriate safety precautions must always be taken when operating or maintaining equipment connected to the BB100. Geist Manufacturing assumes no responsibility or liability for any injury or damage to any persons or property resulting from improper operation or maintenance of a device connected to the BB100.

Caution: **The BB100 unit has not been evaluated for and should not be used in any application in which the failure of the hardware could lead to death, personal injury or severe physical or property damage or environmental damage (collectively, "High-Risk Applications"), including but not limited to the operation of nuclear facilities, mass transit systems, aircraft navigation or aircraft communication systems, air traffic control, weapon systems and direct life support machines. Geist expressly disclaims any express or implied warranty or condition of fitness for High-Risk Applications.**

Networking

Protocols

HTTP, HTTPS (SSL/TLS), SMTP, POP3, ICMP, DHCP, TCP/IP, NTP, Telnet, Syslog

Ethernet Link Speed

10/100 Mbps; full duplex

Data Formats

HTML, SNMP, CSV/Plain Text, XML

EMC Verification

This Class A device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Installation

Guidelines

- If the BB100 is installed in a cabinet the ambient temperature of the rack should be no greater than 45°C.
- Install the BB100 such that the amount of airflow required for safe operation of equipment is not compromised.
- Mount the BB100 so that a hazardous condition is not achieved due to uneven mechanical loading.

Mounting

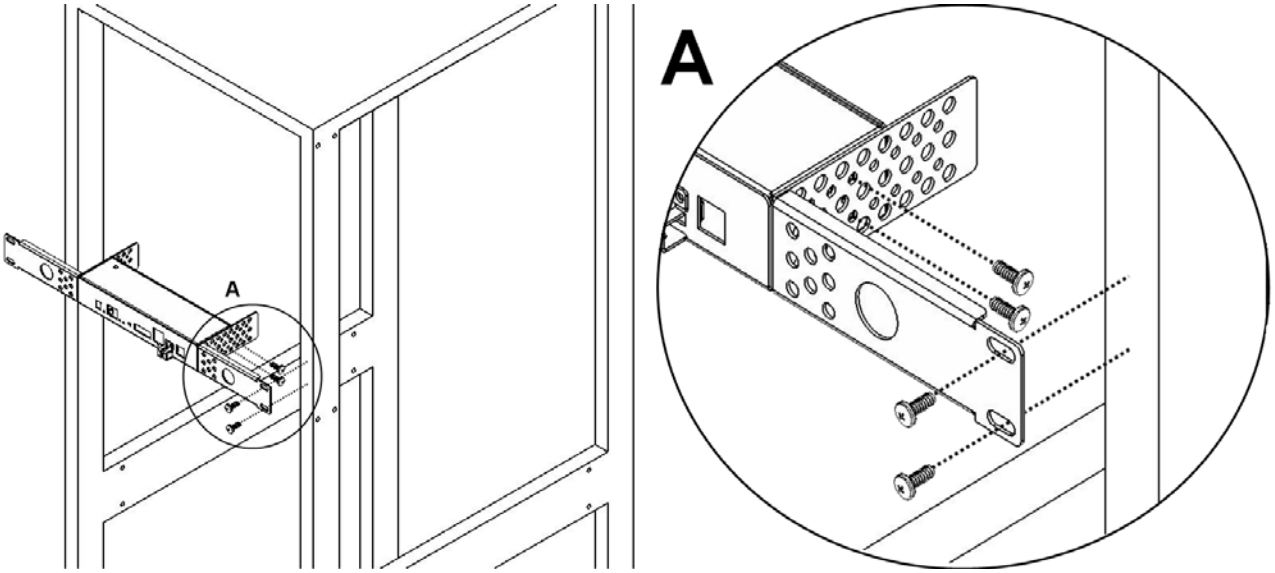


Figure 1: BB100 Mounting Options

Using the 19” horizontal/panel mount brackets, attach unit to rack as shown.

Network Overview

This product comes preconfigured with a default IP address set. Simply connect to the Environmental Monitoring Unit and access the web page with your browser.

Default IP Address

BB100 units have a default IP address for initial setup and access to the unit if the assigned address is lost or forgotten. Once an IP address is assigned to a unit, the default IP address is no longer active. To restore the default IP address, press the reset button located beside the network connector and hold for approximately 20 seconds. The idle and activity lights near the network connector will both light up when the IP address has been reset.

Note: Pressing the reset button will restore the default IP address and will also clear all password settings.

The Configuration page allows you to assign the network properties or use DHCP to connect to your network. Access to the unit requires the IP address to be known, so use of a Static IP or reserved DHCP is recommended. The default address is shown on the front of the unit:

- **IP Address:** 192.168.123.123
- **Subnet Mask:** 255.255.255.0
- **Gateway:** 192.168.123.1

Initial Setup

Connect the BB100 to your computer using a crossover cable or hub/switch.

Windows XP

On your computer, go to “Start > Settings > Control Panel > Network and Dial Up Connections”
Right click on “Local Area Connection” and select “Properties”
Select “Use the following IP address”. Use these settings:

- **IP Address:** 192.168.123.1
- **Subnet Mask:** 255.255.255.0
- **Gateway:** Leave blank

Click “OK” twice.

The unit should now be accessible in a web browser via the unit’s permanent IP address: http://192.168.123.123/. See Unit Configuration (page 16) for details.

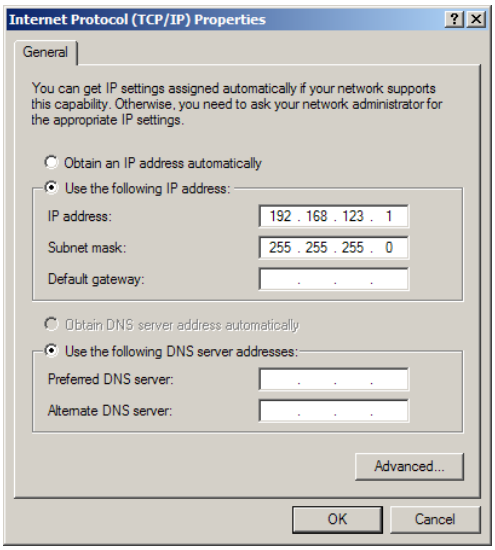

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 123 . 1
Subnet mask: 255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 2: Network settings for initial setup.

MacOS X Leopard

Open System Preferences via the Dock or the Apple menu.

Select "Network" under "Internet & Network."

Select "Ethernet" from the list on the left side of the window and enter these settings on the right side of the window:

- **Configure:** Manually
- **IP Address:** 192.168.123.1
- **Subnet Mask:** 255.255.255.0
- **Router:** Leave blank

Hit "Apply" and confirm the changes.
The unit should now be accessible in a web browser via the unit's permanent IP address: http://192.168.123.123/. See Unit Configuration (page 16) for details.

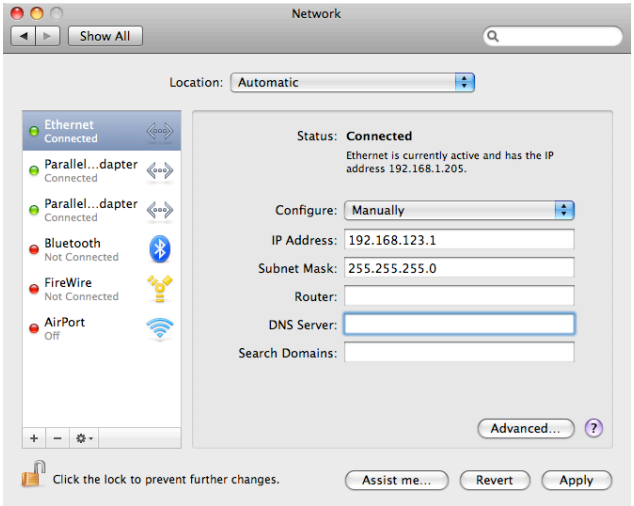


Figure 3: MacOS X network settings for initial setup

Web Interface

Overview

The unit is accessible via a standard, unencrypted HTTP connection as well as an encrypted HTTPS (SSL) connection. The following web pages are available:

Sensors Page

The front page, *Sensors*, gives a real time view of the unit's data. Readings for the internal temperature, humidity and dew point sensors along with all I/O ports and external sensors will be shown.

Optional cameras may be added and their live snapshots are shown on this page. Plug-and-play external sensors appear below the internal sensors when attached.

The menu bar allows access to the rest of the Environmental Monitoring Unit's functionality.

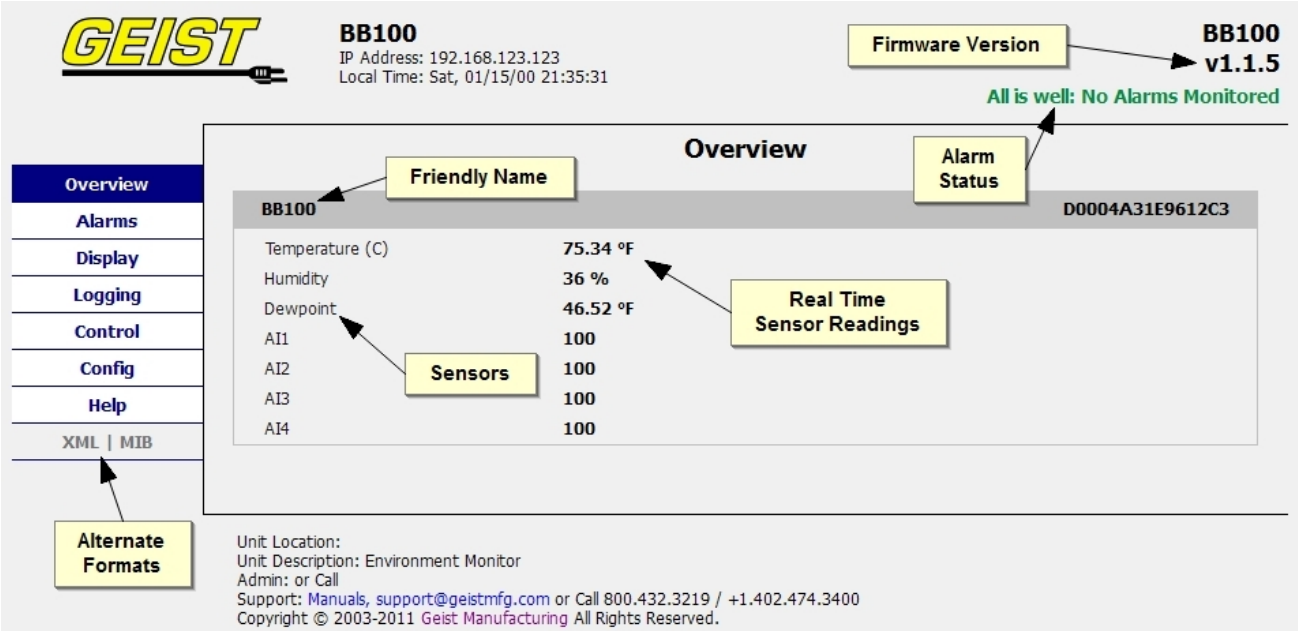


Figure 4: Sensors Page – Internal Sensor and I/O Data

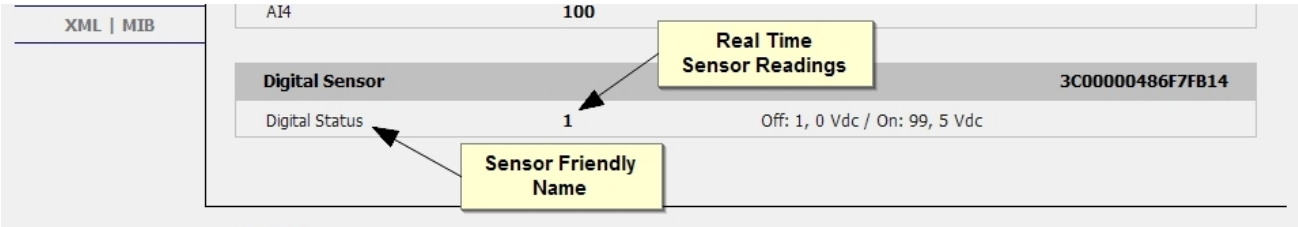


Figure 5: Sensors Page – External Sensor Data

Logging Page

The *Logging* page allows the user to access historical data recorded by the unit. Please note that although data is logged once per minute, all sensor data used in the real time display and alarm functions is read at least once every 5 seconds for internal sensors and once every 30 seconds for external sensors. Recorded data is available for download in a comma-separated values (CSV) file.

Click the "Clear Logs" check box and select "Save Changes" to clear the historical data stored in the device.

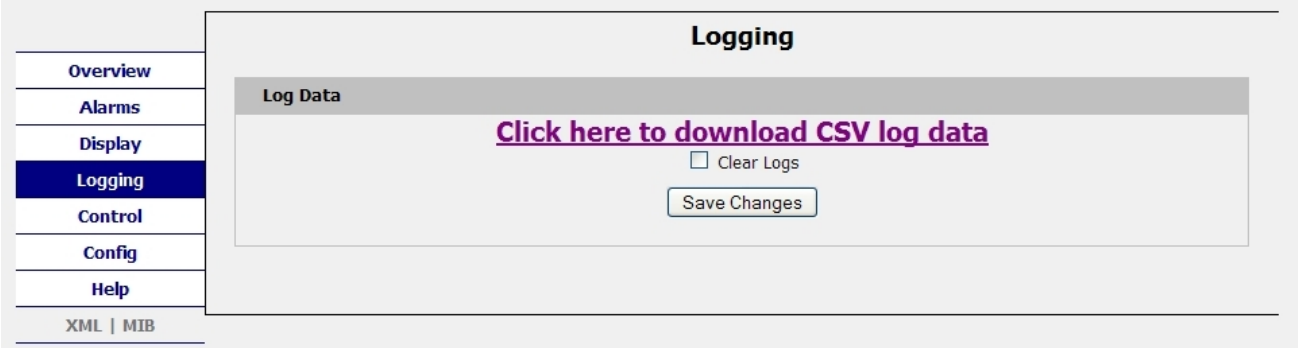


Figure 6: Logging Page

Display Page

The *Display* page allows the user to assign friendly names to internal and attached sensors as well as change the default temperature unit of measure for sensors. The 5Vdc, internal, analog sensors can also be adjusted to show what every range is necessary for the user. There is a linear mapping of 0-5Vdc to the range entered by the user. Additionally, a unit label may be added to make the numbers more meaningful.

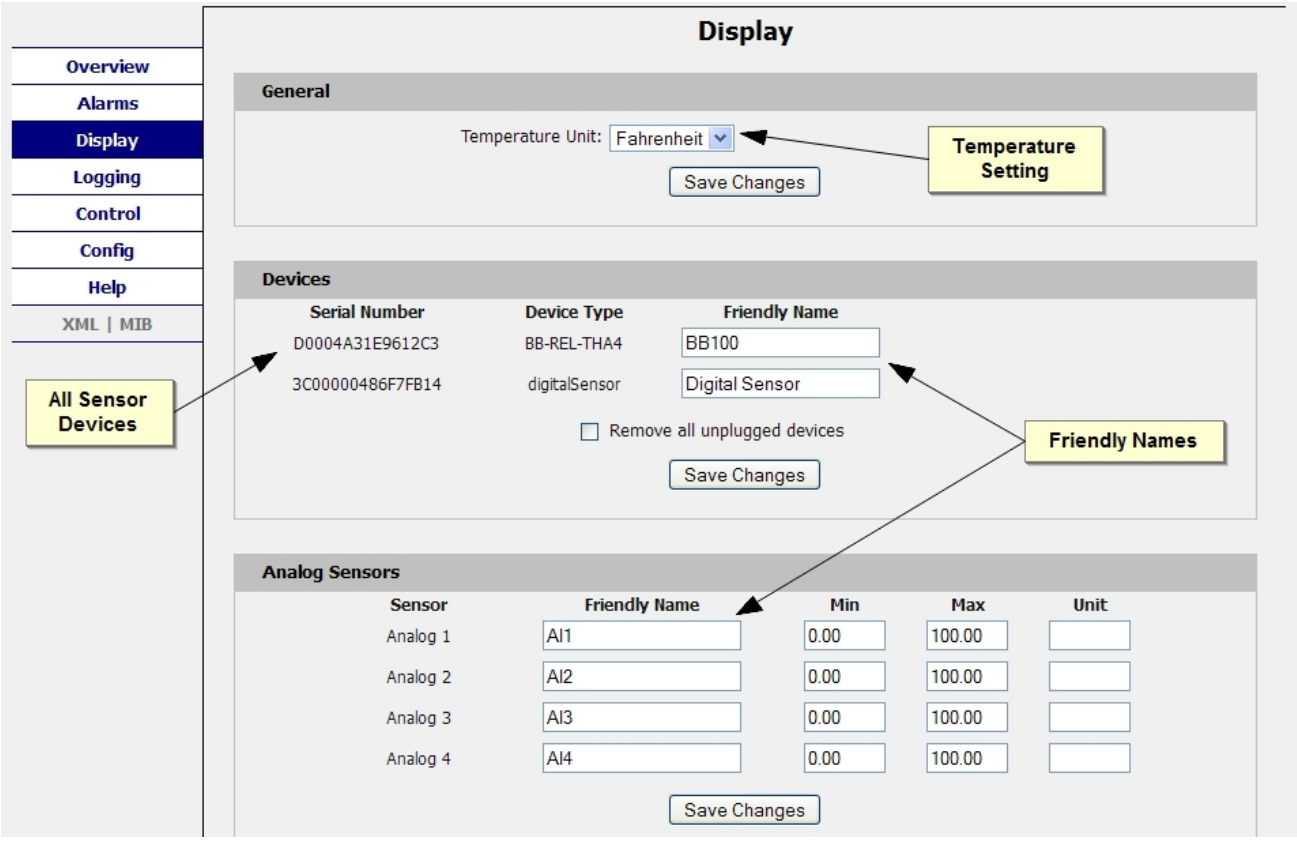


Figure 7: Display Page

Alarms Page

The *Alarms* page allows the user to establish alarm conditions for each sensor reading. Alarm conditions can be established with either high or low trip thresholds. The alarms are displayed in different sections based on the sensor the alarm is associated with. Alarm options include relays, Email and SNMP Traps. See Alarms (page 21) for details.

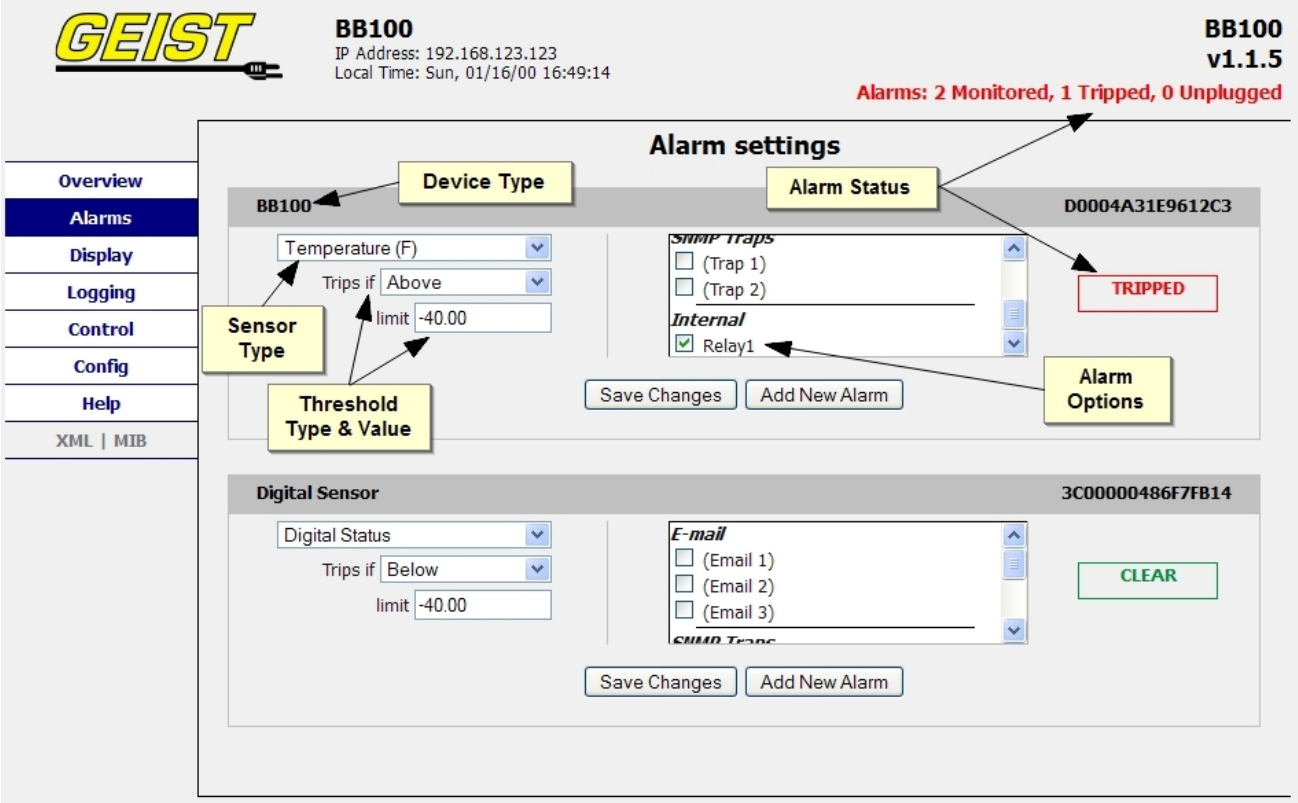


Figure 8: Alarms Page

Control Page

The *Control* page allows the user to control the relay settings for the unit. The BB100 has one relay that can be operated remotely or set to automatically open or close based on alarm conditions. Friendly names for the relay give the option of changing the state name from "Energized/De-energized" to something more meaningful to the user. For more information see Relay Control (page 21).

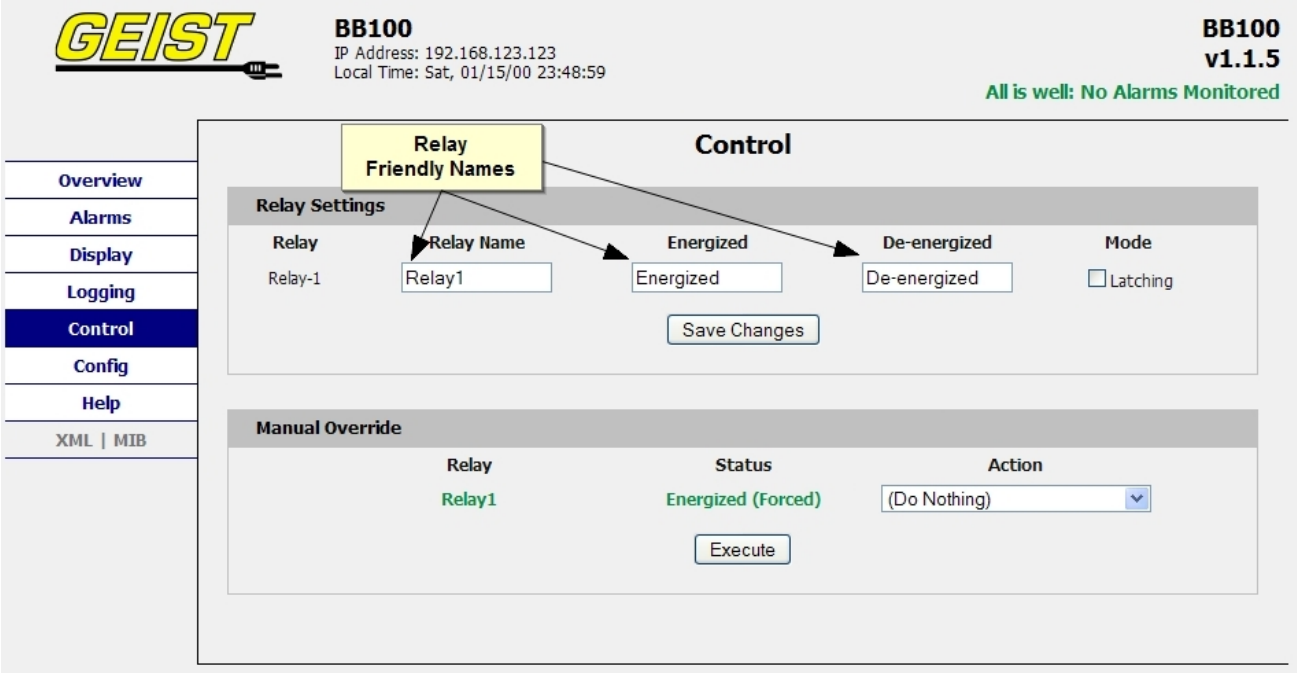


Figure 9: Control Configuration Page

Configuration Page

The *Configuration* page contains many of the settings for the device. Sections for *Network*, *Time*, *Email*, *SNMP*, *User Accounts*, *Administration Information*, *Cameras* and *Diagnostics* are all housed on this page. Each section contains a "Save Changes" to allow for saving the newest settings within that section only. See Unit Configuration (page 16) for more details.

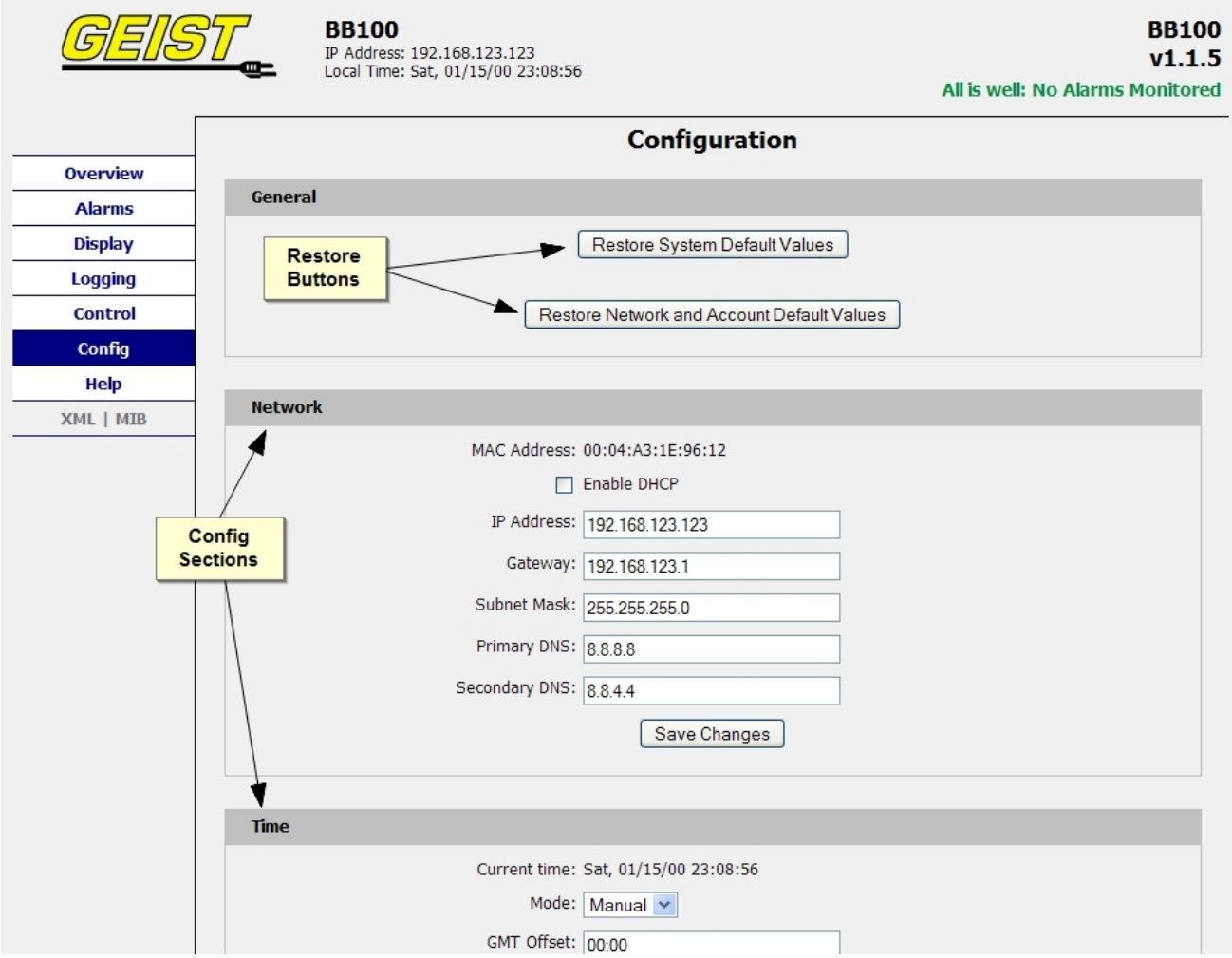


Figure 10: Configuration Page

Unit Configuration

Network

The unit's network configuration is set on the *Network* section of the *Configuration* page. Settings pertaining to the unit's network connection are:

- **DHCP:** Allows the unit to request a dynamic IP address from a server on the network.
- **Static IP Address/Net Mask/Gateway:** When not using a dynamic address, enter static network configuration information here.
- **DNS Servers:** Allows the unit to resolve host names for Email, NTP and SNMP servers as well as cameras.

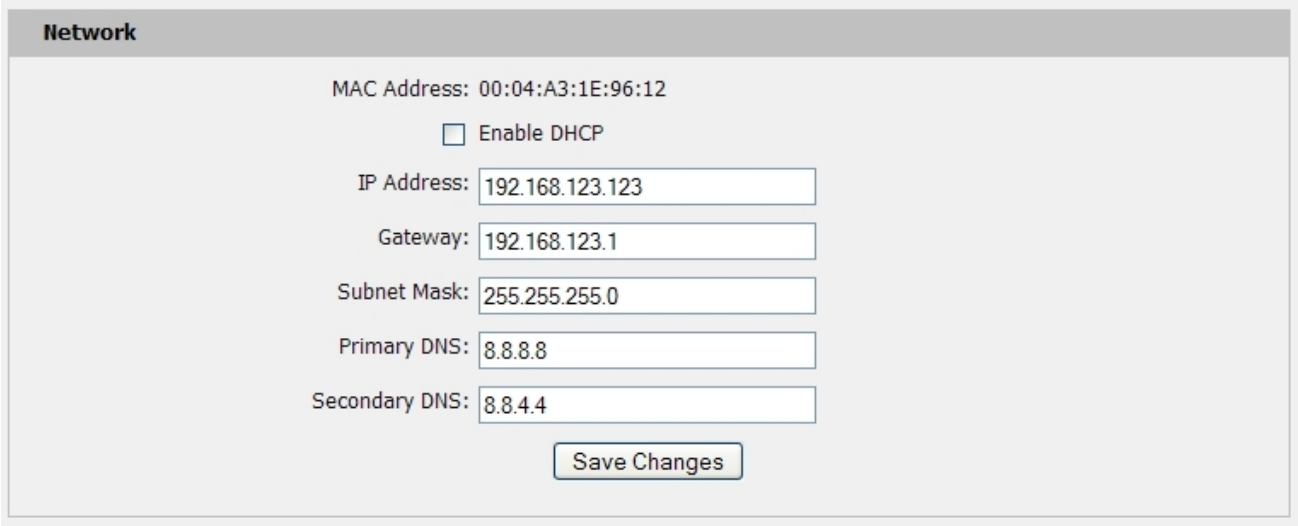


Figure 11: Network Configuration Section

Time and Date

The system clock is set on the *Admin* section of the *Configuration* page. The unit comes preconfigured with the IP addresses of two NIST time servers and is set to the Central Time Zone (-0500 GMT). Should a local time server be preferred, enter its IP address into the "Server" box and click the "Save Changes" button. Clearing the time server addresses and clicking "Save Changes" will set the time servers back to the defaults. The unit attempts to contact the time servers during boot up and periodically while running. Until a time server is contacted or the system clock is manually set, all log time stamps will present time as the number of seconds since the unit was powered up.

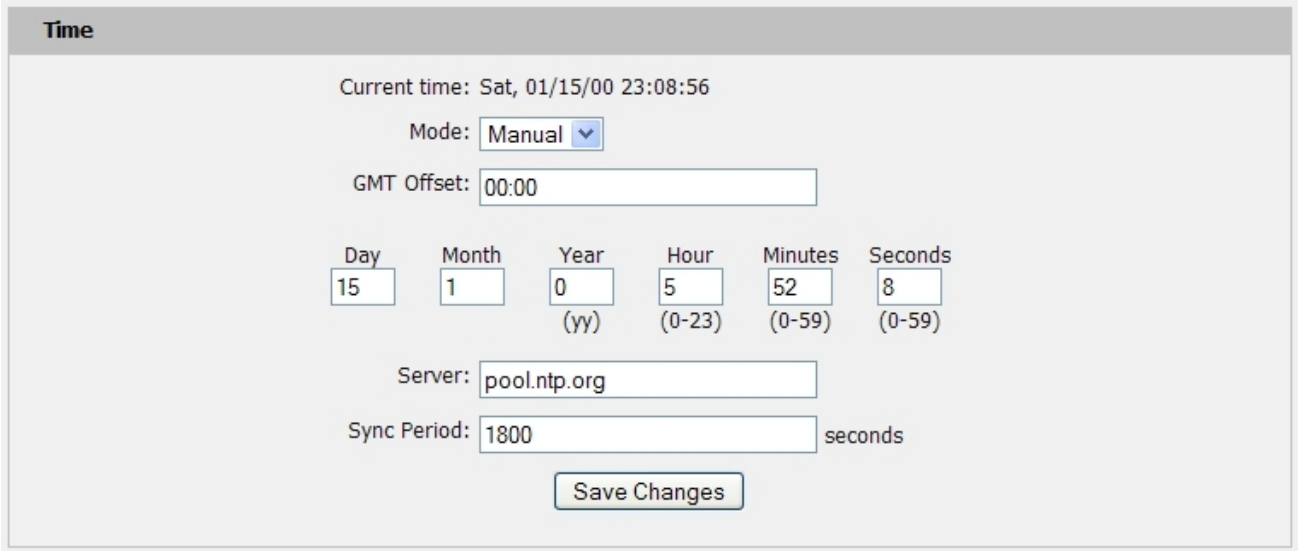
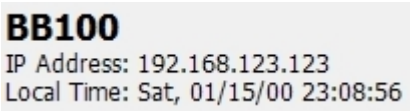


Figure 12: Time Configuration Section

The time, date, IP address and friendly name of the unit are displayed in the top of each web page.



Note: The time and date are not adjusted for daylight savings time. Setting the time zone offset forward and backward an hour will cause a gap or overwriting of logs, respectively.

E-Mail

The unit is capable of sending e-mail to as many as three addresses at once. Most SMTP and ESMTP servers are compatible. Authentication options are None, POP3 (POP-before-SMTP) or ESMTP. The e-mail configuration is set on the *Email* section of the *Configuration* page.

An SMTP server as well as "Sender" and "Destination" addresses are required to send e-mails. Some mail servers may require a username and password. In most cases, the username does not have to match the "Sender" address, but does need to be a valid user on the authenticating server. Microsoft Exchange servers will have to be set to allow SMTP relay from the IP address of the unit. In addition, a test email can be sent from the bottom of this section.

Note: The unit cannot receive e-mails. The POP3 server is used strictly for authentication and is not required when using None or ESMTP.

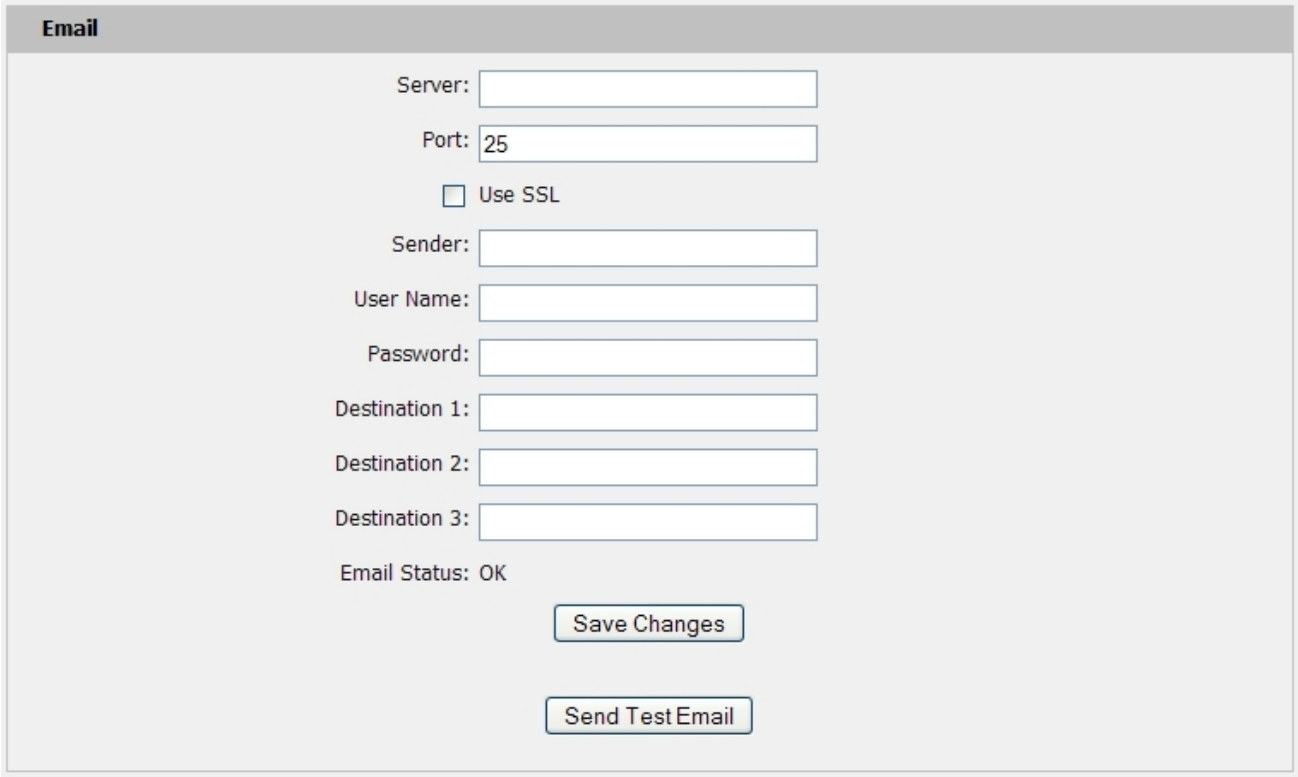


Figure 13: Email Configuration Section

SNMP

The unit supports retrieval of all data via Simple Network Management Protocol (SNMP) v1 and v2c. In addition, alarm traps can be sent to up to two IP addresses. The SNMP configuration is entered on the *SNMP* section of the *Configuration* page.

The default read community string is "public" and the MIB is downloadable via a link on the unit's web page.

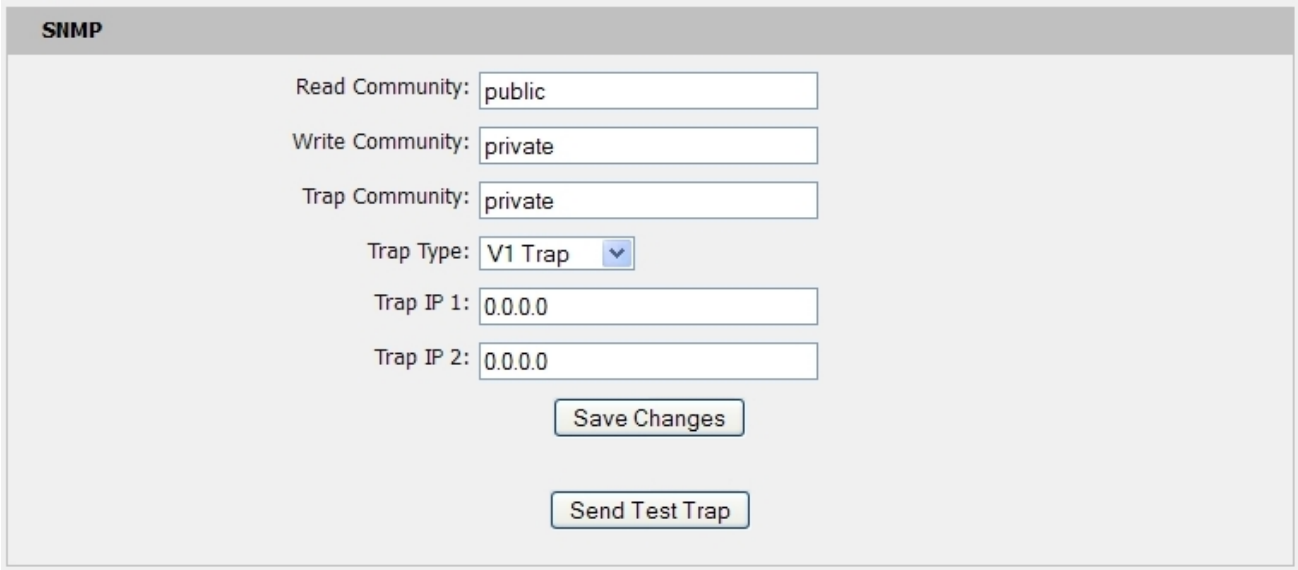


Figure 14: SNMP Configuration Section

User Accounts

BB100 Series offer account security options that are entered on the *User Accounts* section of the *Configuration* page. There are three levels of account security:

- **Administrator:** Password protects the Display, Alarms and Configuration pages.
- **Control User:** Password protects the Control Actions and Control Settings pages.
- **View User:** Password protects the Sensors, PDA, WAP and XML pages.

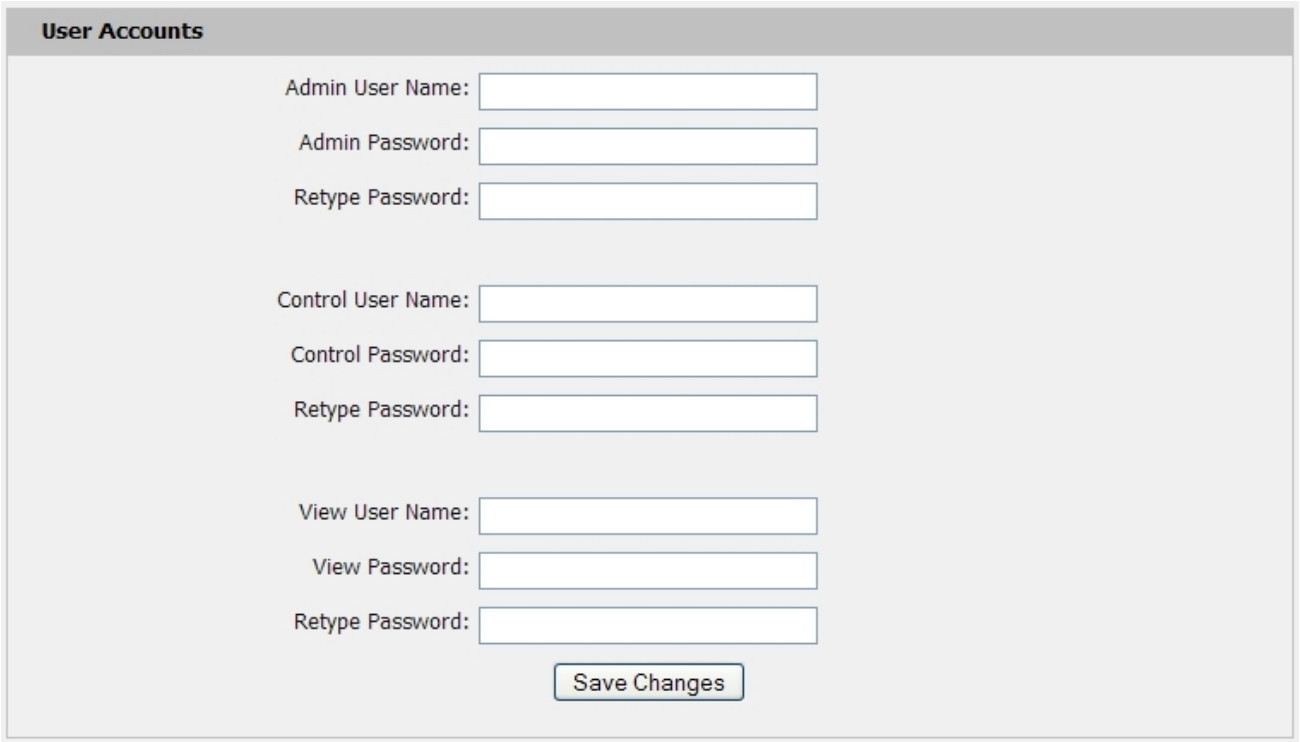


Figure 15: User Accounts Configuration Section

User account names may include alphanumeric characters, spaces and underscores. Passwords may include alphanumeric characters and underscores.

Note: The Administrator account must be active to enable the Control Access and View-Only accounts.
Note: The Control Access account must be active to enable the View-Only account.
Note: The account names "root" and "admin" are disabled for security reasons and cannot be re-enabled.
Warning: Record your passwords. To reset lost passwords, follow the instructions for resetting the unit's IP address and passwords given in the Default IP Address section (page 8).

Admin Information

Information entered in the *Admin Info* section of the *Admin* tab of the *Configuration* page will show up at the bottom of the unit's web interface.

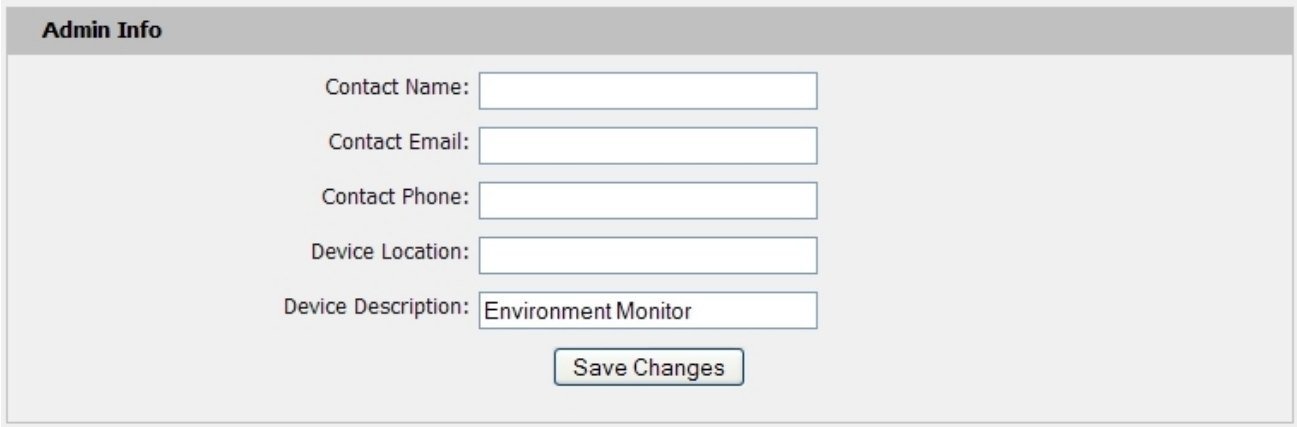


Figure 16: Admin Information Configuration Section

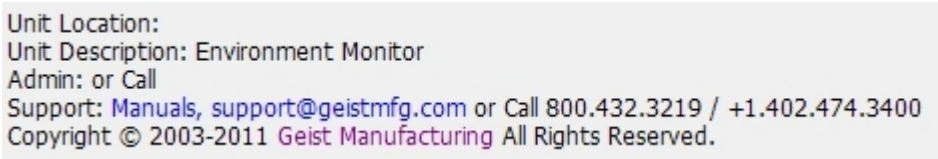

Unit Location:
Unit Description: Environment Monitor
Admin: or Call
Support: Manuals, support@geistmfg.com or Call 800.432.3219 / +1.402.474.3400
Copyright © 2003-2011 Geist Manufacturing All Rights Reserved.

Figure 17: Admin Information Display

Camera Configuration

Enter the domain names/IP addresses and models of up to four IP-addressable network cameras in the *Cameras* section on the *Configuration* page. The unit will present a linked snapshot from each camera on the *Sensors* page.

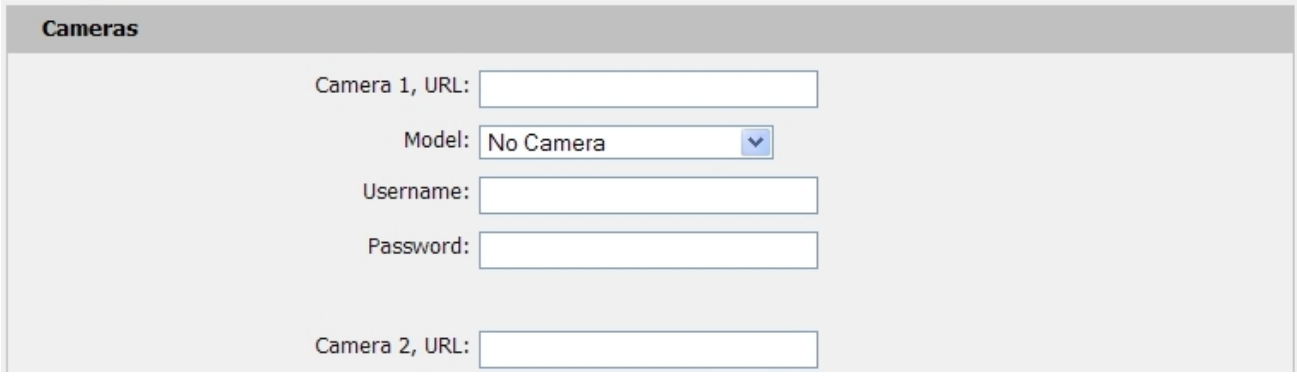


Figure 18: Cameras Configuration Section

Note: Each camera must be set to allow anonymous access to enable this feature.

Relay Control

Relay Contact Ratings

The output relay contacts are intended to carry low voltage signals only. Do not exceed the following ratings on the output relay contacts:

DC: 60 V, 30 W

AC: 30 Vrms, 1 A

Relay Settings

The BB100 Series units provide one output relay that can be operated remotely or set to automatically open or close based on alarm conditions. A relay in non-latching mode will automatically energize and de-energize as its associated alarms trip and clear. A relay in latching mode will similarly energize on an alarm trip, but will only de-energize when acknowledged by the user. See *Alarms* (page 23) for additional information on associating an alarm condition with one of the output relays.

Manual Override

The output relay can be operated remotely through the *Manual Override* section of the *Control* page. The user can force the relay to energize or de-energize by selecting the desired action in a drop down menu and clicking the execute button. The current relay status is displayed in the *Manual Override* section of the *Control* page. The word “forced” is displayed next to any relay that has been manually forced to a given state. Any forced relay will not change state based on alarm status. Relays can be released from a forced energized or forced de-energized state by selecting the Release Override option in the drop down menu.

Acknowledgments

Any relay in latching mode will change from de-energized to energized if it receives an alarm trip; however, the relay will not change from energized to de-energized when the alarm status returns to normal until the user acknowledges the pending change. Similarly, any relay in latching mode will change from de-energized to energized if it receives a manual override Force Energized command; however, the relay will not change from energized to de-energized when the Release Override command is issued until the user acknowledges the pending change. The user must check the Acknowledge and De-energize box on the *Control* page for a latched relay to de-energize.

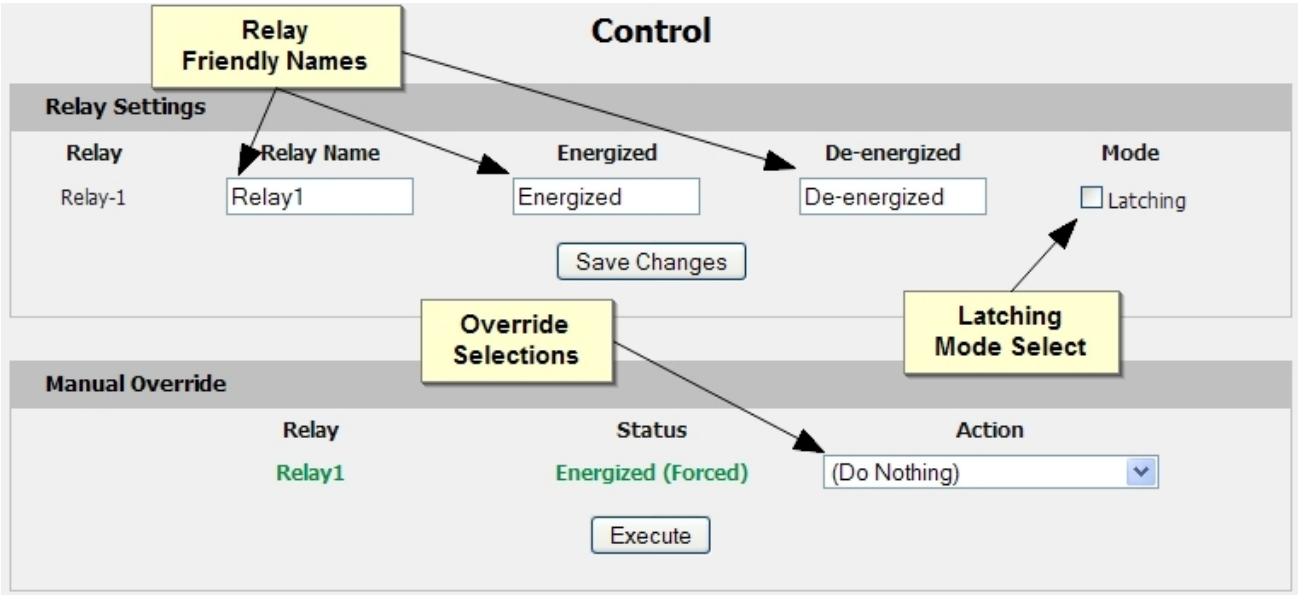


Figure 19: Relay Control Options

Alarms

Alarm Notifications

The BB100 supports three types of alarm notification:

- **Relay:** The unit can be configured to energize/de-energize one control relay.
- **E-Mail:** The unit can be configured to send alarm e-mails to up to three recipients.
- **SNMP:** The unit can be configured to send SNMP traps to up to two trap servers.

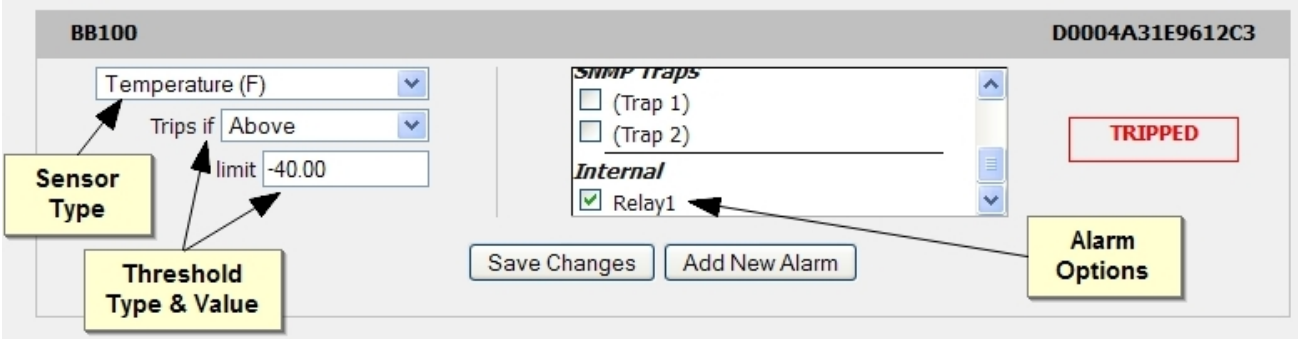


Figure 20: Alarms Options

The unit is capable of any combination of the above alarms at once. Alarm type combinations are selected per alarm via the check boxes which are displayed for each alarm on the *Alarms* page.

Alarm Types

The BB100 provides three types of alarm messages via E-Mail and SNMP:

- **Trip:** Occurs when a sensor value goes above a high trip threshold or below a low trip threshold.
- **Clear:** Occurs when a sensor already in the Tripped or Unplugged state goes back into its normal range.
- **Unplugged:** Occurs when a sensor with an alarm set loses contact with the main unit due to the sensor being physically unplugged or another communications error.

Alarms can be added for each internal device or external sensor displayed on the Alarms page. An alarm is added by pressing the “Add New Alarm” button and selecting the sensor value to be monitored from a drop down menu.

Alarm Removal

To remove an alarm, select “REMOVE ALARM” from the sensor type drop-down menu then click the “Save Changes” button.

Thresholds

The user must set a trip threshold and type for each alarm that is added to the Alarms page. The threshold type is chosen as “Trips if” either “Above” or “Below” from a drop down menu when the alarm is created. The threshold value is typed into a data window when the alarm is

created. Alarms are triggered based on the selected sensor's data and the trip threshold type and value. Alarm settings can be edited or deleted at any time.

Analysis of each unit is recommended before setting alarm thresholds as some of the values monitored by the unit are relative values whose scale will differ slightly between units. Allow each unit to operate under normal, steady-state conditions for several hours before setting alarm thresholds. By allowing the sensors to operate for several hours, the user can better understand what the normal variations are; thereby allowing the user to choose alarm thresholds that will not trigger numerous false alarms.

Note: Changes in settings take a few moments to become active. Rapidly resetting alarm values may not provide the desired results. Allow up to 2 minutes after changing a setting before modifying it again.

Sensors

Overview

All internal sensors are measured every 5 seconds. External sensors are measured every 10 to 30 seconds, depending on the number of devices connected. Sensor data collected by BB100 units provides useful trend analysis data. While all values are not absolute in relation to a known unit, trend analysis of the data allows users to view changes and draw useful conclusions about what is happening over time in the monitored environment.

Internal Sensors

BB100 units contain the following onboard sensors:

- **Temperature:** Measures temperature and can be displayed in °C or °F. The accuracy is ±1 °F from -50 °F to 185 °F. Note: This sensor may be heated by internal circuitry in the unit; a temperature offset is available to re-calibrate.
- **Humidity:** Measures the percent of water vapor in the air within ±5%.
- **Dew Point:** Calculated measurement of temperature at which moisture in the air will turn to water based on the humidity and temperature measurements.
- **AI1:** Scales 0 to 5 Vdc input to 0-99, dry contacts may be used.
- **AI2:** Scales 0 to 5 Vdc input to 0-99, dry contacts may be used.
- **AI3:** Scales 0 to 5 Vdc input to 0-99, dry contacts may be used.
- **AI4:** Scales 0 to 5 Vdc input to 0-99, dry contacts may be used.

I/O Sensors

The BB100 units come equipped with four I/O ports for connecting additional external sensors such as Water and Door Sensors. The four ports are designed to accept a 0-5 Vdc analog input; alternatively, an internal 100K pull up resistor to 5 V allows for the use of dry contacts. The I/O port input is converted to a digital number ranging from 0 to 99 and is displayed on the *Sensors* page. Unused I/O ports will display a value of 99. This range can be adjusted on the display page allowing the user to modify the value to make it more meaningful to the user.

Water sensors act as conductivity bridges. Moisture across the contacts causes the value to drop. Door switches can be wired in a serial connection; if the chain is broken the entire group is classified as open. The limiting factor on the I/O ports is the length of the wire, found to be around 400 feet.

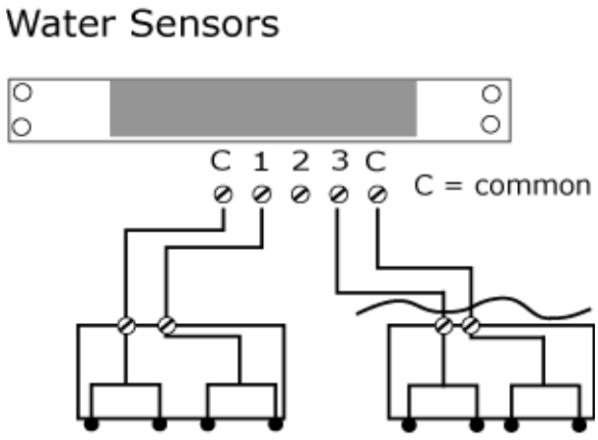


Figure 21: Water Sensor Wiring Example

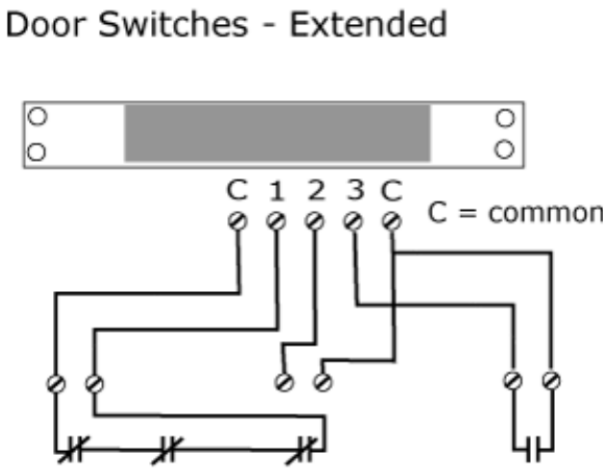


Figure 22: Door Sensor Wiring Example

Additional Optional I/O Sensors

- **RWS:** Water Sensor
- **RDPS:** Door Sensor
- **SA-1:** Smoke Alarm
- **RCP-2:** 125 V City Power Monitor
- **WSK-10:** 10' Water Sensing Cable Kit
- **WSK-40:** 40' Water Sensing Cable Kit
- **-48 VDCM:** Power Monitor
- **30 VDCM:** Power Monitor

Remote Sensors

Available Sensors

- **RT:** Temperature
- **RTAFHD3:** Temperature / Air Flow / Humidity / Dew Point
- **CCAT:** Converts analog I/O Sensors to Remote Digital Sensors
- **RS2:** Remote power monitoring and switching

RTAFHD3 Compatibility

The (G)RTAFHD3 sensor cannot be utilized in combination with the discontinued (G)RTAF and (G)RTAFH sensors or (G)RTHD sensors built prior to 2010. If you desire to add (G)RTAFHD3 sensors to an existing installation currently utilizing incompatible sensors, please contact Customer Service for installation options.

Connecting Remote Sensors

Plug-and-play remote sensors may be attached to the unit at any time via the RJ-12 connectors on the face of the unit. In some cases splitters may be required to add additional sensors. Each sensor has a unique serial number and is automatically discovered and added to the web page. Up to four sensors may be connected to the BB100.

The display order of the sensors on the web page is determined by the serial number of each sensor. Friendly names for each sensor can be customized on the *Display* page.

Note: The sensor uses Cat. 3 wire and RJ12 connectors. Wiring must be straight-through: reverse polarity will temporarily disable all sensors until corrected.

Note: The sensors use a serial communication protocol and are subject to network signaling constraints dependent on shielding, environmental noise, and length of wire. Typical installations allow runs of up to 600 feet of sensor wire.

Accessories

IP-Addressable Network Cameras

The unit is able to interface with up to four IP-addressable network cameras. A live snapshot from each camera will be displayed on the unit's *Sensors* page underneath the main unit's graph. Clicking on a snapshot opens the camera's website in a new browser window.

Figure 23: Camera Images

Camera model and IP address are entered on the *Monitoring* tab of the *Configuration* page.

Note: Some cameras require additional software downloads to display live video in a web browser.

RSC Integration

For users with multiple units, Geist RSC software offers:

- Convenient, single-window monitoring of multiple units via simple web-based interface
- Streamlined firmware updating
- Consolidation of alarm settings

See http://www.geistmfg.com for more information.

Alternate Data Formats

In addition to the full access, control and configuration available via a desktop web browser, BB100 Series products present data in multiple formats for easy integration with other monitoring systems. Data formats available via links on the unit's web page are:

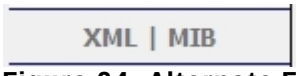


Figure 24: Alternate Format Links

- **XML:** Extensible Markup Language. Presents data in a structured tree for use with automated scripts and monitoring systems.
- **MIB:** Management Information Base. Downloads the MIB for use with SNMP monitoring tools.

Technical Support

Firmware Version

The firmware version is located in the upper right section of the web interface header, represented by v3.y.xx. Before contacting support, it is recommended that the BB100 unit first be updated to the latest firmware version. If this is not possible, please have the unit's existing firmware version number available when contacting technical support.

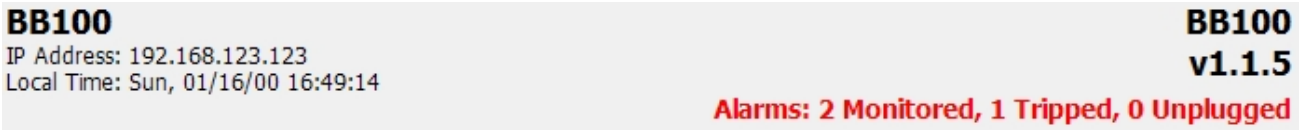


Figure 25: Web Page Header

Firmware Updates

Keep your unit updated with the latest firmware releases or sign up for notifications at the following website: http://www.geistmfg.com/GeistUS/Docs/downloads.htm.

Resetting the Unit

Should the BB100 unit loose communication; the processor may be manually rebooted by pressing the 'Reboot' button on the face of the unit.

Service and Maintenance

No service or maintenance is required. Do not attempt to open the unit or you may void the warranty. No serviceable parts inside.

More Technical Support

http://www.geistmfg.com
(800) 432-3219
Email: support@geistmfg.com
Or contact your distributor.

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Revision History

Revision	Date	Notes	Approved By
1.0	9/12/2011	Initial Version	CG, AK